BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - II COMPUTER SCIENCE & ENGINEERING : SUMMER : 2024
SUBJECT: MATHEMATICS FOR COMPUTING-II

Day : Tuesday
Date : 21/05/2024

S-24024-2024

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat diagrams **WHEREVER** necessary.

Q.1 Find Fourier sine series of $f(x)=\sin^2 x \quad in \quad (0,\pi)$. **(10)**

OR

Q.1 Obtain the Fourier series of $f(x)=\begin{cases}\pi+x & -\pi<x<0\\ \pi-x & 0<x<\pi\end{cases}$. **(10)**

Q.2 Find Fourier transform of $f(x)=e^{-|x|}$. **(10)**

OR

Q.2 Prove that $\int_0^\infty \frac{x\sin mx}{1+x^2}dx=\frac{\pi}{2}e^{-m}$. **(10)**

Q.3 Find inverse Laplace transform of $f(s)=\frac{21s-9}{(s+1)(s-2)^3}$. **(10)**

OR

Q.3 Find $L(F(t))$ where $F(t)=\begin{cases}(t-1)^2, & t>1\\ 0 & , t\in(0,1)\end{cases}$. **(10)**

Q.4 Change the order of $\int_0^a \int_{\sqrt{a^2-y^2}}^{y+a} f(x,y)dxdy$ **(10)**

OR

Q.4 Evaluate $\int_0^a \int_0^{a-\sqrt{a^2-y^2}} \frac{xy\log(x+a)}{(x-a)^2}dxdy$ **(10)**

Q.5 Find the directional derivative of $\phi=e^{2x}\cos yz$ at $(0,0,0)$ in the direction of tangent to the curve x = asint, y =acost, z = at where $t=\frac{\pi}{4}$. **(10)**

OR

Q.5 Show that $\nabla^2\left(\nabla.\left(\frac{\bar{r}}{r^2}\right)\right)=\frac{2}{r^4}$. **(10)**

Q.6 If $\bar{F}=(2x+y^2)\bar{i}+(3y-4x)\bar{j}$ then find $\int_c \bar{F}.d\bar{r}$ where c is the parabolic arc $y^2 = x$ joining (0,0) and (1,1). **(10)**

OR

Q.6 Using Green's theorem, evaluate $\int \bar{F}.d\bar{r}$ for the field $\bar{F}=x^2\bar{i}+xy\bar{j}$ over the region R bounded by $y = x^2$ and line $y = x$. **(10)**

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